Quantification of Growth Factors from Two Different Methods of Activating Platelet Preparations

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Final degree project

Objectives

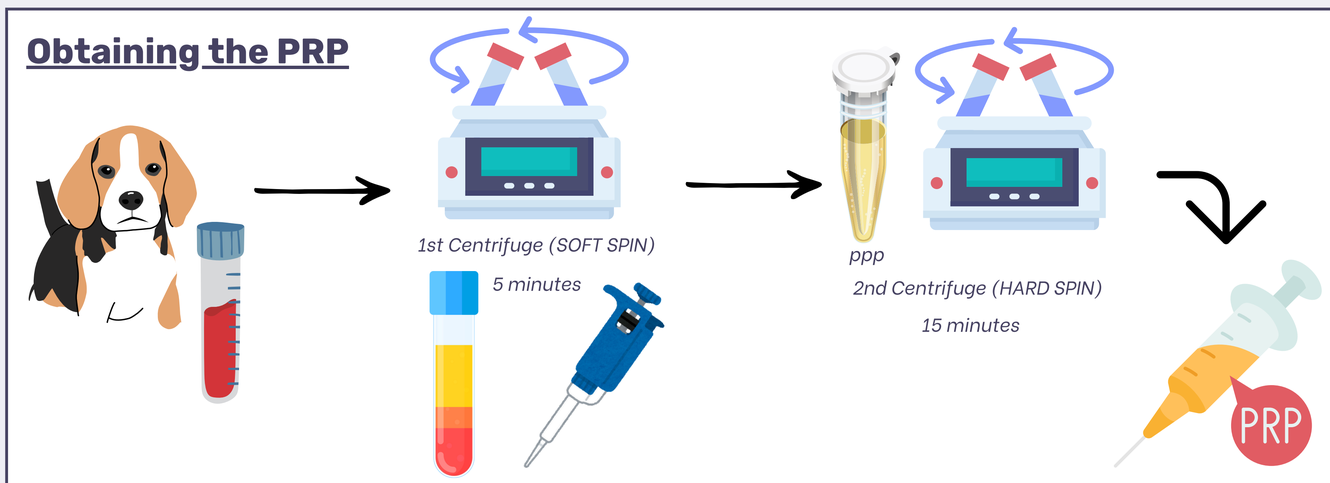
- Compare the efficacy and viability of the freeze-thaw cycles method versus the use of CaCl2 in obtaining Growth Factors (GFs) in canine Platelet Lysate (PL).
- Determine if there are significant differences in the results of the two methods and conclude which method is more effective and efficient for accurately obtaining GF in canine LP.

Introduction

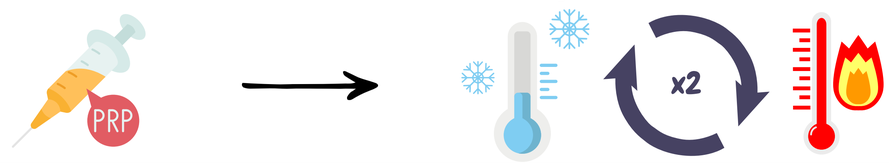
Platelet-rich plasma (PRP) is an autologous plasma volume with a high platelet concentration. It is obtained through centrifugation, which separates platelets from other blood components. PRP can be applied directly to injuries or activated to release GFs. Its use leverages the regenerative properties of platelets and is studied for applications in both human and veterinary medicine, including orthopedics and wound healing. PRP efficacy depends on the quantity and quality of platelets and GFs, with activation methods like freeze-thaw cycles and CaCl2 addition. Both methods effectively release GFs and promote healing.

Matherials & methods

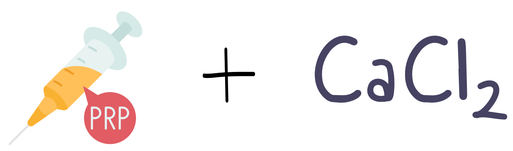
Obtaining the PRP



Activation with freeze and thaw cycles



Activation with calcium chloride addition



Results

The ELISA results of samples 1 and 2 reveal significant variations in GFs levels between different blood components. An increase in platelet and GFs levels is observed in plasma compared to PRP, where all values have increased. After platelet activation, the GFs count varied. With activation through freeze-thaw cycles, a significant increase in GFs values was observed for both TGF- β1 and PDGF-BB . In contrast, activation with CaCl2 resulted in a decrease in GF concentration.

Table 1. Platelet detection before and after plasma concentration

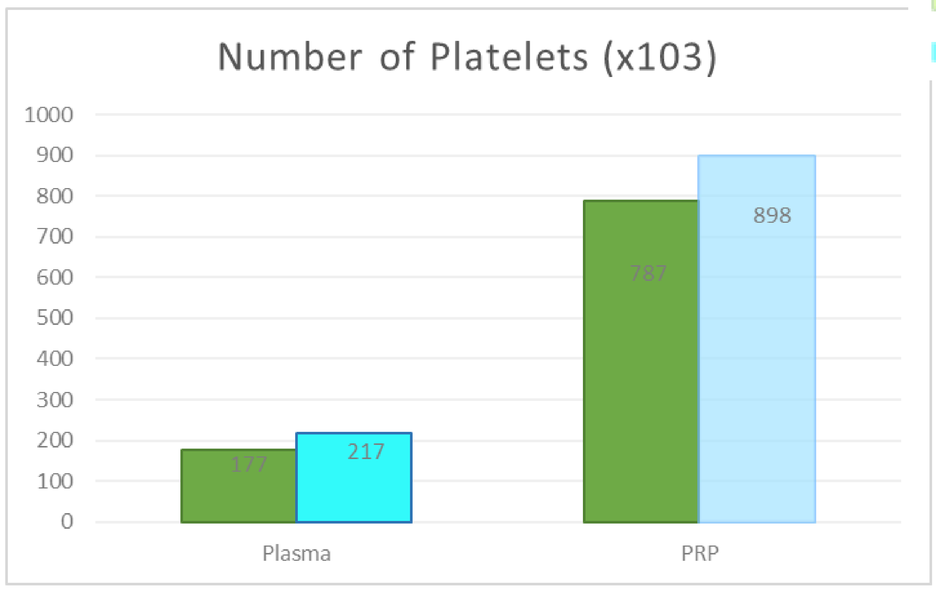
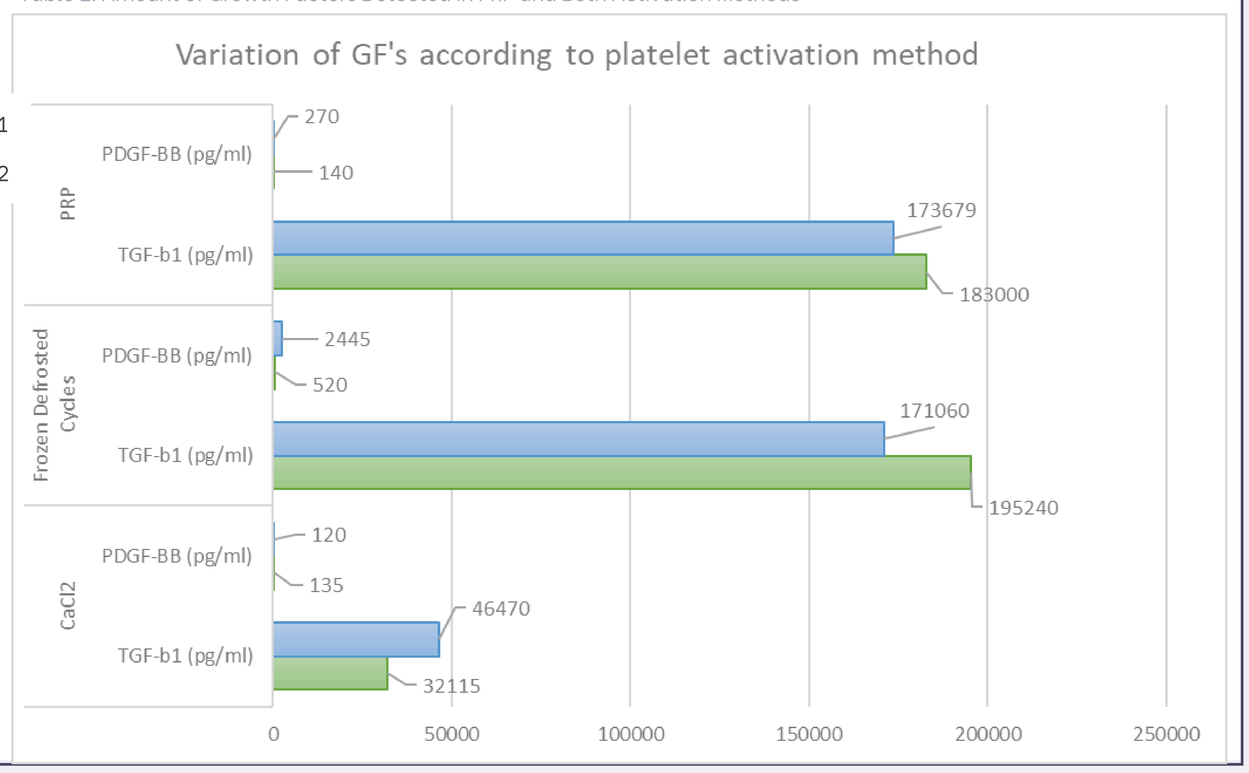


Table 2. Amount of Growth Factors Detected in PRP and Both Activation Methods



Conclusion

- The freeze-thaw cycles method is effective in obtaining GFs in canine LP, exceeding initial GF levels in PRP. This method proved to be simple, not requiring the addition of external factors, making it practical and accessible for various clinical and research settings. However, the addition of CaCl2 did not significantly increase GF levels, possibly due to factors that might have altered the results.
- Significant differences were observed between the two methods in our experiment. Incorrect ELISA test readings with CaCl2 addition prevent us from conclusively determining the efficacy of this method. Moreover, the variability in results suggests the need for greater standardization and experimental control. Therefore, it is not possible to determine which of the two methods is more effective and efficient for accurately obtaining GFs in canine LP.